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ABSTRACT

In an examination of the relationship between language skill and reading achievement in adults, measures of syntactic knowledge and reading achievement were obtained for 41 students in an adult basic education center. Moderate correlations were found for language skill and reading achievement, with students reading at or below the fourth grade level showing significantly less knowledge of syntax than adults at higher levels, even though the language test involved neither reading nor writing. Analysis of the results indicated that while the best predictors of reading comprehension were other achievement measures, addition of scores on verbal justifications for the language measure added significantly to the prediction of reading comprehension. (Author/FL)

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Language and Reading Skills in Undereducated Adults

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Paper presented at Mid Western Educational Research Assn.

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ABSTRACT

Language and Reading Skills in Undereducated Adults

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A relationship between language skill and reading achievement in children is widely accepted, but there has been relatively little examination of such relationships in adults. There are, however, important individual differences in both reading and language skills in adults.

In order to examine such relationships, measures of syntactic knowledge and reading achievement (CAT) were obtained for 41 students in an adult basic education center. Adults reading at or below 4th grade level showed significantly less knowledge of syntax than adults at higher levels, even though the language test involved neither reading nor writing.

Moderate correlations were found for language skill and reading achievement.

Factor analysis indicated that the initial reading status showed a small positive loading on a factor defined primarily by high loadings on the linguistic measures.

Multiple regression, based not only on the language and reading measures but on several demographic variables, showed that while the best predictors of reading comprehension were other achievement measures, addition of scores on verbal justifications for the language measure added significantly to the prediction of reading comprehension.

As our population shifts to a greater proportion of adults, and society expresses greater concern over the educational achievement of adolescents and adults, there is greater need to explore possible blocks to learning. Given the relationships observed and the fact that the language measures appeared relatively unbiased (minimal correlations with age, sex, and ethnic group), there is support for further analysis of the relationship of language and reading skills among adults.

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This study of the relationship of language skill and reading in adults was motivated by the following consierations:

1) Language skill and reading ability are widely assumed to be related in children;

2) Skilled adult readers are generally credited with considerable language skill;

3) Not all adults, however, are equally skilled in their own language;

4) Not all adults are skilled readers.

If adults vary in both reading ability and language skills that raises the question of whether there is, even among adults, a relationship between language skill and reading. The question is of interest both as a potential basis for curriculum planning and as an extension of our knowledge of the course of development of language and reading. The factors listed above will be considered in greater depth.

The role of language in reading is described by Goodman:

> "The reader brings to the text his knowledge of the language. As he reads there is an interaction between language and thought processes such that the reader moves from a language encoding of meaning to the meaning itself . . . on the basis of language structures he controls, the reader is constantly predicting what he will see." (Goodman, 1973, p. 295)

Skilled adult readers are generally credited with considerable knowledge of language patterns. Kolers, for example, states that "the skilled reader looking at a page of text is more sensitive to its grammatical regularity than to its appearance." (Kolers, 1973, p. 42).

Weber, however, raises questions about the uniformity of the language skills underlying reading: "It is convenient to talk about English as though everyone -- including children -- always used the same phonological system, the same rules for forming sentences, and the same vocabulary for talking about the same things. Most treatments of language with reference to reading avoid dealing with the range of variation within English. . ." (Weber, 1973, p. 282).

It is generally acknowledged that children vary widely in language skill. (The aspect of language emphasized here is syntax, the organization of words into sentences.) During the early 1960's, a period marked by the strong influence of transformational grammar (Chomsky, 1957), it was often stated that children had attained mature competence in syntax at least by age four. Continuing research on children's language has indicated that there is still growth through at least the end of the elementary years (Menyuk, 1972; Chomsky, 1969; Palermo and Molfese, 1972). This growth is particularly noticeable for (a) patterns that form exceptions to general rules, (b) constructions that signal later-developing logical concepts; and (c) metalinguistic awareness, the ability to take language deliberately as an object of thought.

The lack of consensus among competent adults (Kemper et al., 1977; Greenbaum, 1975) and the range of language skills in adults is supported by a variety of sources (Hutson, 1977; Kramer, Koff & Luria, 1973). In reading, adults range from high levels of sophistication to illiteracy.

Examination of differences between adults in knowledge of language structures would be facilitated by a theoretical model of sufficient breadth to allow one to trace developmental continuities and changes from childhood to adulthood, and at the same time to explore individual differences within age groups.

Hutson (1976) has proposed a model for the development of syntactic knowledge spanning the period from infancy to adulthood. Knowledge of syntax is viewed as expanding to increasingly higher levels in such a ways that each level

of understanding about syntactic structure serves as a foundation for the next level of knowledge and is incorporated into the next level. Not all individuals would necessarily move as rapidly through the levels or attain the same final levels, but one would be very unlikely to attain a high level of knowledge about a given structure without having achieved at least a certain degree of mastery of the preceding level.

In this framework, Level I involves the development of presyntactic knowledge of object names, events to be expected in this world, and the simplest sentence structures. Level II is the period during which one learns to comprehend most of the sentence patterns used in his culture. Level III involves the ability to perform simple logical operations upon language, such as judging whether two sentences are equivalent in meaning. Much of the growth in this level of knowledge is achieved for many children by the end of the elementary years. A few children, however, have not mastered this level of knowledge by that time, and this ability appears to be related to reading ability (Hutson, 1976). Syntactic knowledge at Level IV is the ability to conceptualize sentence structure in a formal operational way that allows one to note the joint and separate effects of changes in sentences form as they relate to meaning. Not all adults would be likely to attain this level of knowledge about syntax, given both individual differences in ability and style and the differentiation of areas of knowledge in adults.

It is also essential to employ measures sensitive to the level of development at which variability exists for a given group. For example, a highly abstract task calling for formulation of a verbal rule might be inappropriate for assessing differences within a group of children because none could succeed.

Similarly, a measure of sentence comprehension (Level II in the model described earlier), unless it involves very complex or unfamiliar constructions,

might show no differences between adults when in fact very real differences in concepts of language structure exist. In most groups of adults, then, it would probably be more useful to assess differences at higher levels of knowledge. In graduate student groups, for example, the differences of greatest interest might be differences in ability to succeed in Level IV tasks of formal operational thinking about language structures.

Within a group of adults still in the process of learning to read, the level of knowledge of language of greatest interest might be Level III, the ability to perform simple logical operations upon language structure (e.g., the ability to judge whether two sentence mean the same thing.)

It is likely that when an individual comprehends a sentence structure, but just marginally, that structure is of very litte use to him as a tool in deriving information or relationships from a passage of text. It is only when the structure is comprehended automatically or at an awareness level (Wardhaugh, 1969) that is likely to aid comprehension. For this reason a test of ability to judge sentence equivalence or some other task that requires an individual to separate himself from his language and to make language an <u>object of thought</u> is likely to be of interest in studying knowledge of language structure in adults who have not completed a high school diploma or its equivalent. The sentence equivalence task has the additional feature of focusing the subject on <u>relationships</u> between sentences, which appears to be an important ability in many domains.

In reading, adults vary from high levels of sophistication to illiteracy. Adult functional literacy is a pressing social concern. Our understanding of the difficulties faced by many adults in learning to read may be deepened by examining language skills and their relation to reading ability in adults who are still in the process of learning to read.

While the primary focus in the study presented here was on language skill, reading ability and their relationships, it was also considered of interest to

examine their relationship to a larger set of variables including demographic variables.

This study was designed to answer the following questions:

1) Do adults differ in language skills?

2) Are language skill and reading ability related?

3) What is the relationship between language skill, reading ability and other selected characteristics of undereducated adults?

METHOD

Sample: Subjects were forty-one adults enrolled in an individualized adult learning center in a middle-sized northeastern city. The sample included 30 males (10 black and 20 white) and 11 females (6 black and 5 white) ranging in age from 16 to 62. Sources of referral to this center included voluntary self-referrals from adults who wanted to improve their academic skills for personal or economic reasons, clients entered in programs such as Manpower or Comprehensive Employment Training Act, clients referred from various social rehabilitation services and students who were suspended from or had dropped out of high school.

Procedures: To obtain a measure of the language skills of each student, a test of sentence equivalence (a measure of Level III syntactic knowledge, the ability to perform simple logical operations on language) was administered to each student individually. Sentences were read aloud to the students. Students were asked (1) to judge whether or not two sentences meant the same thing (a yes/no Response), and (2) to tell why or how they knew that the two sentences did or did not mean the same thing (Justification). Justifications were not scored as correct unless the corresponding Response was correct.

Materials: The sentence equivalence test consisted of 8 pairs of sentences (see Table 1). Each pair contained an active and a passive sentence. In four of the pairs, the two sentences were referentially equivalent in meaning (as in pair 1, Table 1). In the other four pairs the two sentences were non-equivalent (as in pair 2).

The Total Reading score on the California Achievement Test given at the time of a student's entry into the program was used as the measure of reading ability.

Design: Means and standard deviations for all subjects on all variables were obtained. Pearson product-moment correlations between all the variables were computed.

Subjects were divided into three groups (Primary, Intermediate and Secondary) on the basis of their CAT Reading scores for an analysis of variance on the Linguistic Response scores and Justification scores.

Factor analyses of all major variables using squared multiple correlations as original estimates of communality and rotating to a Varimax orthogonal solution were performed. Multiple regression was computed, using all the other variables to predict CAT reading and then to predict Linguistic Response.

RESULTS & DISCUSSION

The analyses reported here were intended to answer three questions:

1) Do adults differ in their linguistic skills?
2) Is there a relationship between linguistic skills and reading ability?
3) What is the relationship between language skill, reading and other selected characteristics of undereducated adults?

Do adults differ in their language skills?

Yes. Significant individual differences were found in the ability of adults to recognize the equivalence of passive and active sentences. These adults had an overall mean of 6.6 correct Linguistic Responses of 8 possible responses on the sentence equivalence task, on which the chance level would

have been 4. The range of scores was from 4 to 8. Since ten of the subjects obtained perfect scores, this measure may underestimate the range of language skills in the adult population.

There were also individual differences in the ability to provide Justifications for sentence equivalence. The mean score for Justifications was 5.6. Scores ranged from 2 to 8 with only five subjects obtaining the maximum score. The Justification score was open-ended and a chance score would be hard to determine.

The mean for Justifications was lower than the mean for Responses. This is probably due to two factors. First, since Justifications were not counted unless the Response was correct, the mean for Justifications could not have exceeded the mean for Responses. Second, it is usually more difficult to verbalize a rule than to apply it. The correlation between Response and Justification for sentence equivalence was .84, suggesting that while there is substantial relationship between these two aspects of behavior, there are some aspects of each behavior that are not explained by the other.

Is there a relationship between linguistic abilities and reading ability?

Yes. The correlation between the California Achievement Test Reading score and Linguistic Response was .49 and the correlation between the CAT reading score and Linguistic Justification was .48. This indicated a moderate relationship between language skills and reading in undereducated adults.

Another way of looking at the relationship between linguistic abilities and reading was to divide the subjects into groups on the basis of initial CAT reading scores and to compare the linguistic skills of these groups. The sample was divided into three groups: Primary (0.0 to 3.9 grade level, mean reading level 0.6), Intermediate (4.0 to 7.9, mean 6.0), and Secondary (8.0 to 11.9, mean 10.1). Mean scores for sentence equivalence Responses and Justifications are given for these groups in Table 2.

Analysis of variance for Linguistic Response revealed a significant effect for reading level ($F=6.66$ (df 2,38); $p < .01$). Scheffé test indicated that means for students in the Intermediate and Secondary reading levels were not different from one another, but both means were significantly greater than the mean Linguistic Response for students reading on the Primary level.

Analysis of variance for Linguistic Justifications showed a significant effect for reading level ($F=4.52$ (df 2,38); $p < .01$). The Scheffé test again revealed differences between the Primary and both other reading levels, but not between Intermediate and Secondary levels.

Both analysis of variance and correlations indicate that there is a significant relationship between language skill and reading abilities for undereducated adults. This relationship in the present instance was most strongly marked at the lower end, but this estimate was conservative since there appeared to be a ceiling effect for Linguistic Response on the sentence equivalence task.

What is the relationship of language, reading, and other characteristics?

In order to examine interrelationships among variables in this set, factors were extracted from the correlation matrix by using a principal axis technique with squared multiple correlations as the original estimate of communality. Factors with eigenvalues above 1.0 were rotated in an orthogonal Varimax solution. The first factor seemed to be defined primarily by the initial reading score, highest grade level attained prior to entry in the program, and by age, which in this sample was negatively related to highest grade level. That is, some of the oldest subjects (ages 56 and 62, for example), had not gone far in school.

The second factor was defined primarily by loadings for linguistic response and justifications, but had a loading of .35 for initial reading. The third factor appeared to reveal some residual relationships between demographic variables and reading after the effects of general schooling factor (Factor 1)

and the linguistic awareness factor (Factor 2) had been removed. These appeared to be an aspect of initial reading ability, at least in this sample, that is related to sex and ethnic status. Females scored lower on initial reading than did males, and black students as a group scored lower than white students.

Thus there seems to be several aspects of initial reading -- this variable was related to schooling, to linguistic awareness, and to demographic characteristics. This pattern of relationships was consistent across other factor-analytic procedures, including obligue solutions and truncated principle components. Although demographic characteristics were related to initial reading status, they were not related to the linguistic measures, suggesting that these measures are not strongly biased against one social group.

In order to determine the best prediction of initial reading status, a stepwise multiple regression was performed. When no restrictions were placed on the order in which variables entered the equation, highest grade level prior to entry in the program was found to be the best predictor of initial reading, explaining 32% of the variance, linguistic response was the next best predictor, adding 16%. The only other variable to add significantly to prediction of initial reading was ethnic group, with a negative beta weight. This suggests that although a significant relationship between reading status and ethnic group was not initially apparent, when the effects of highest grade level and linguistic response were removed, there was a residual relationship between reading status and ethnic group. Black students as a group scored lower on the reading test. The high correlation between linguistic response and linguistic justification made it unlikely that justification would add significantly to prediction, once the variance associated with sentence equivalence responses had been accounted for.

The results of the multiple regression support those of the factor analysis in suggesting that initial reading score is related to three different variables amount of prior schooling, linguistic awareness, and demographic characteristics.

CONCLUSION

The model of the development of syntactic knowledge outlined by Hutson (1977) was found useful in suggesting that individual differences between undereducated adults would be found for Level III tasks of simple logical operations upon language structures.

Both linguistic awareness and reading ability were found to vary in this group of adults, and skill in the two areas was found to be related. Better readers had higher language scores than poor readers even though the sentence equivalence language measure did not require any reading by the subject.

It is suggested that both the reading achievement measure and the sentence equivalence measure may reflect more basic abilities to abstract and comprehend relationships and to objectify information - to hold it out and examine it.

In a sense, the sentence equivalence task may assess an aspect of intelligence, but it appears to be relevant to a major social concern, the development of reading skills in adults, and does not appear to be strongly biased against one group.

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TABLE 1

Sentence Equivalence Test

Do these two sentences mean the same thing?
How can you tell?

1. The mother washes the baby.
   The baby is washed by the mother.

2. The tiger is grabbed by the monkey
   The tiger grabs the monkey.

3. The girl is spanked by the father.
   The father spanks the girl.

4. The monkey pats the clown.
   The clown is patted by the monkey.

5. The Indian carries the horse.
   The Indian is carried by the horse.

6. The soldier is bumped by the truck.
   The soldier bumps the truck.

7. The girl is dropped by the doll.
   The doll drops the girl.

8. The pig pulls the elephant.
   The pig is pulled by the elephant.

TABLE 2

Mean Linguistic Response and Justification
for Each Reading Level

Reading Level	n	Initial Reading	Linguistic Response	Linguistic Justification
Primary	(5)			
$\bar{x}$		0.6	5.0	3.6
s			1.1	0.9
Intermediate	(26)			
$\bar{x}$		6.0	6.7	5.7
s			1.0	1.8
Secondary	(10)			
$\bar{x}$		10.1	7.0	6.3
s			1.8	1.8
Total				
		6.4	6.6	5.6
			1.2	1.8

TABLE 3

Intercorrelations of All Variables for All Subjects

	Age	Sex	Ethnic	Highest Grade	Ling. Resp.	Ling. Just.	Initial Reading
$\bar{x}$	25.2	.27[a]	.39[b]	9.2	6.6	5.6	6.34
s	10.4	.45	.49	2.2	1.2	1.8	3.00
Age							
Sex	.03						
Ethnic	-.03	.19					
Highest Grade	-.73	.13	.14				
Linguistic Response	-.39*	-.10	.64	.16			
Linguistic Justification	-.43**	-.27	.01	.27	.84**		
Initial Reading	-.49**	-.14	-.18	.57**	.49**	.48**	

a) o=Male, :=Female

b) 0=White, 1=Black

*p <.05

**p <.01

TABLE 4

Factor Loadings of all Variables
after Varimax Rotation

Variables	Factor 1 "Schooling"	Factor 2 "Linguistic Awareness"	Factor 3 "Demographic"
Age	-.71	-.28	-.03
Sex	.04	-.18	.39
Ethnic	.00	.07	.55
Highest Grade	.98	.02	.21
Linguistic Response	.18	.91	-.02
Linguistic Justification	.26	.87	-.14
Initial Reading	.61	.35	-.32
Percent of Common Variance	36.00	35.00	6.00

TABLE 5

Summary Table of Stepwise Multiple Regression of Initial Reading with Six Independent Variables for All Subjects

Step	Independent Variable	Multiple R	Multiple R^2	Increment in R^2	d/f	F	d/f	Improved F
1	Highest Grade	.57	.32	.32	1/39	18.30	1/39	18.30**
2	Linguistic Response	.69	.48	.16	2/38	17.50**	1/38	11.69**
3	Ethnic Group	.74	.55	.07	3/37	15.18**	1/37	5.96*
4	Sex	.75	.57	.02	4/36	11.75**	1/36	1.21
5	Age	.76	.58	.01	5/35	9.56**	1/35	0.91
6	Linguistic Justification	.76	.58	.00	6/34	7.87**	1/34	0.32

* $p < .05$

** $p < .01$

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